Directorate of
Intelligence

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International Economic & Energy Weekly

25X1

19 August 1983

Secret

DI IEEW 83-033
19 August 1983

Copy 854

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International Economic & Energy Weekly

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International Economic & Energy Weekly

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Synopsis

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New materials are being developed that increase the strength and durability as well as lower the operating costs of a wide variety of commercial products and military systems. 25X1

High-Technology Materials: Intensifying Foreign Competition 25X1

Materials development has long been driven by pressures from within industry. Now this is changing. Governments in Japan and France, in particular, are instituting national programs for R&D and are moving quickly to develop indigenous production capabilities. 25X1

South Korea: Moving Up the Technology Ladder 25X1

South Korea is embarking on an ambitious plan to restructure its industrial base in favor of skill- and knowledge-intensive industries. Seeking a second economic takeoff, the Chun government is targeting microelectronics, computers, machine tools, and sophisticated shipbuilding for rapid growth. 25X1

Japan: Financial Strength Spurs Auto Industry 25X1

The enormous financial power of the major Japanese automobile firms gives them a substantial advantage in competition that will involve the world's auto manufacturers during the balance of the 1980s. 25X1

Bahrain: Offshore Banking 25X1

Offshore banks have boosted Bahrain's foreign exchange earnings, provided high-paying jobs, and enhanced Bahrain's prestige as a regional financial center. Recent protectionist moves by the Saudi Arabian Monetary Authority, increased competition from banks in Saudi Arabia and Kuwait, and lower regional oil revenues are likely to slow the sector's growth. 25X1

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Perspective

High-Technology Materials

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Advanced materials, such as ceramics and composites, are becoming increasingly important to the economic and military capabilities of industrialized nations. These materials will increasingly determine the performance and competitiveness of a wide range of civil and military items. On the military front, for example, a tank's performance could be enhanced by using ceramic engine components. On the commercial side, markets potentially affected by advanced materials—transportation, electronics, computers, telecommunications, and machine tools, among others—are cumulatively worth hundreds of billions of dollars annually.

Materials development has long been driven by pressures from within industry, a process rarely of direct concern to policymakers. Now this is changing. Governments in Japan and France, in particular, are no longer willing to leave national progress in advanced materials to the uncertainties inherent in private-sector investment decisions. Instead, they are instituting national programs for R&D and are moving quickly to develop indigenous production capabilities.

Foreign successes in advanced materials have several important economic and strategic implications for the United States. For one thing, leadership in advanced materials can translate into strong competitive leverage for products in world markets. In addition, emergence of strong foreign capabilities in advanced materials complicates US efforts to control the flow of such technology, especially to the Communist countries.

The growing role played by advanced materials and the concentration of productive capacity could make these materials a security-of-supply issue of the 1990s. A number of factors contribute to our concern on this score. One of the most important is the emphasis in a few countries, particularly Japan, to develop plant capacity well before markets develop. This could lead to overcapacity which may discourage potential US producers from entering the field. Hence, the relevant production technology for selected materials—design and manufacturing capabilities, production experience, and know-how—for key military and civilian applications may never be established.

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Briefs

Energy

Italian Problems in Using Algerian Gas

According to Italian press reports, Sicilian authorities, who are committed to taking 30 percent of Italy's Algerian gas purchases, have ordered the state electricity company to convert two oil-fired power plants to gas. The conversion will take about 10 to 12 months and is expected to cost nearly $10 million. The move resulted from a slowdown in the development of gas infrastructure due, in part, to delays in passing legislation to provide financial incentives to communities and firms participating in the construction project. Even if development is completed, however, Sicily could still be faced with an oversupply of Algerian gas due to sluggish growth of demand. As a result, officials may order other power plants converted to gas and block plans to build coal-fired facilities and nuclear plants in southern Italy. 25X1

Kuwait Changes Oil Marketing Strategy

Kuwait is actively seeking buyers for its crude oil on the spot market, a strategy the Kuwaitis have refrained from using until now. According to Embassy sources, approximately 125,000 b/d in spot sales have already been arranged for the third quarter, with some crude selling for as much as 28 cents above the official price of $27.30 per barrel. In addition to raising revenue, the increased production is welcome news for Kuwaiti industry, which has suffered over the past six months from reduced availability of oil-associated natural gas for the country's electric power and natural gas liquids plants. 25X1

Iran Raises Price on Heavy Crudes

Iran's national oil company, NIOC, has announced price increases on its heavier grade crude oils. NIOC hiked its 31-degree API Iranian heavy and Sirri crudes by 20 cents and $1.20 per barrel, respectively, effective on 10 August. Iranian heavy—which constitutes nearly half of Iran's oil exports—now sells for $27.10 per barrel and Sirri crude for $26.75 per barrel. Demand for heavier crudes has been fairly strong in recent months, particularly in countries with refineries equipped to process heavier grade crudes into lighter products such as gasoline and diesel fuel. 25X1

Phillips To Process With Ekofisk Waterflood

According to press reports, the Norwegian Government has agreed to special tax concessions that will allow Phillips Petroleum to proceed with an enhanced recovery project at the Ekofisk oilfield. Under the agreement Phillips will be permitted to accelerate the writeoff of the project's development costs. The waterflood project, due to be completed in 1987, is expected to cost about $2 billion and will yield an additional 150-200 million barrels of oil. Although the Norwegian Government has recently rejected industry suggestions that modifications to the present tax structure are required to optimize offshore development, this concession could indicate a new willingness by the government to consider future tax changes. 25X1

Indonesia and South Korea Agree on LNG Trade

After more than two years of negotiations, Indonesia has agreed to supply South Korea with 2 million tons of LNG annually for 20 years. Deliveries from Indonesia's Arun LNG facility in northern Sumatra will begin in early 1987 at a price—currently about $5.10 per million Btu—pegged to a basket of Indonesian crudes. According to an industry source, Pertamina—Indonesia's state-owned oil company—has obtained two LNG tankers from South Korea. Seoul plans to use the LNG in power plants and for home heating. 25X1

Irish Oil Find

The first promising oil discovery in Irish waters in over 12 years has sparked a wave of speculative fever and may lead to greater exploration in the area. Although the discovery has not yet been declared commercially viable, the first two tests have produced oil flows at rates of 2,600 and 6,500 barrels per day, respectively. The only commercial hydrocarbon discovery in Irish waters to date was the Kinsdale field, about 100 kilometers south of the new discovery, which was discovered by Marathon Oil in 1971 and began commercial production in 1979. Seven more test wells are planned for the southern section of the Celtic Sea this year based on new seismic techniques that enable geologists to look below the chalk deposits in the shallow waters. 25X1

Speculation on recoverable reserves by the oil industry based on the first test results suggest ranges from 30 million to 200 million barrels. The more optimistic figure would make financially hard-pressed Ireland, which currently imports nearly all its oil, self-sufficient. Even if the new find proves not commercial at current prices, it probably will generate continuing interest in the area that many oil industry sources believe contains commercial quantities of oil. 25X1

International Finance

Mexico Announces Public-Sector Debt Rescheduling

Treasury Secretary Silva Herzog on Sunday, the day before Mexico's second extension of its public-sector debt moratorium ran out, announced agreement for rescheduling $20 billion of public-sector debt. Silva Herzog said the agreement will be signed on 26 August, just over a year after Mexico City announced suspension of principal repayments. The US Embassy indicates, however, that this agreement will only cover the debt of the three largest public-sector borrowers. This probably indicates final details of individual agreements with over 25 other Mexican agencies remain to be worked out. According to press reporting, financial terms remain the same as those proposed last December—an eight-year rescheduling with a four-year grace period and interest rates of 1.87 percentage points over the London interbank offer rate or 1.75 points over the US prime rate. 25X1

Mexico Meets Second-Quarter IMF Targets

According to Embassy reporting, the IMF recently informed Mexican policymakers that Fund analysis of budget and financial data indicates that Mexico was in compliance with stabilization targets through midyear. The Embassy also reports that the Bank of Mexico this week plans to draw its third $325 million quarterly IMF loan installment and $600 million remaining from the second tranche of its $5 billion commercial loan. Mexican financial authorities indicate that these funds will be used later this month to help liquidate the remaining $1.2 billion short-term BIS swap loan. Despite Mexico City's eligibility to draw the $1.1 billion third tranche of the commercial loan, US Embassy sources indicate that policymakers believe financial reserves are adequate to allow them to postpone the drawdown for a month or more. 25X1

Venezuelan Debt Talks Stall

Finance Minister Sosa reportedly is again asking US lenders to reschedule Venezuela's debt while refusing to accept their demands for tough economic adjustments. The bankers indicate they will not participate in a refinancing program while overdue interest payments mount on loans to Venezuelan borrowers. Venezuela also has begun negotiations with the IMF, but Caracas insists that austerity policies pose unacceptable political risks during a presidential election year. 25X1

Neither side is likely to compromise much, and without an IMF program Caracas will only continue postponing principal payments on short-term debts this year. This will prevent it from obtaining new funds and trade credits and cause a substantial reduction in imports that will disrupt the economy. The deterioration in the economy is increasing the likelihood that the government party will be defeated at the polls in December. 25X1

Global and Regional Developments

Kuwaiti and Saudi Aid for Iraq

The US Embassy in Kuwait reports that Kuwait and Saudi Arabia will, on Iraq's behalf, sell some 248,000 barrels per day of crude oil from the Neutral Zone, a jointly administered area whose oil production is shared equally by the two countries. Earlier information had indicated that only some 74,400 barrels per day from Kuwait's share would be supplied. The Arabian Oil Company began marketing the crude for Iraq earlier this month. Since April, Saudi Arabia also has been supplying Iraqi customers with more than 240,000 barrels per day—worth about $2.4 billion annually—from Saudi oilfields. 25X1

If the entire allotment from the Neutral Zone is in addition to the Saudi aid, as appears likely, Iraq will gain an additional $2.5 billion over the next year. The income would provide the Iraqis significant balance-of-payments relief, but it would not be enough to spare them from making additional cuts in imports this year. 25X1

Debt-Troubled LDC Exports Remain Weak

Exports of many debt-troubled LDCs continued to decline in first-quarter 1983. For a selected group of 12 countries, seasonally adjusted exports fell an estimated 15 percent from fourth-quarter 1982. Most of the decline was due to a falloff in sales from oil-exporting LDCs. Nigerian exports plummeted over 50 percent while Mexico's foreign sales were down about 25 percent. Despite the overall decline, three debt-troubled LDCs—Argentina, Brazil, and Ecuador—registered a significant increase in exports in the first quarter. On the whole, exports of debt-troubled LDCs probably remained depressed in the second quarter. Lower oil prices, continued import cuts by some LDCs, and the roughly four-quarter lag between OECD economic revival and recovery of LDC exports probably held foreign sales of many debt-troubled countries in check. [redacted] 25X1

Exports of Selected Debt-Troubled LDCs [a] *Million US $*

	1981	1982					1983
		Total	I	II	III	IV	I
Argentina	9,140	7,620	2,280	2,100	1,460	1,810	2,300
Brazil	23,290	20,180	5,360	5,010	5,090	4,750	5,130
Chile	3,910	3,820	980	980	970	890	920
Costa Rica	960	870	230	230	210	200	190
Ecuador	2,540	2,140	560	540	560	480	560
Mexico	19,380	21,580	4,220	5,070	6,240	6,180	4,750
Peru	3,250	3,230	770	880	790	800	620
Panama	330	370	70	100	80	120	80 [b]
Philippines	5,650	4,970	1,270	1,290	1,190	1,220	1,150 [b]
Nigeria [b]	17,370	14,280	3,780	3,260	3,470	3,780	1,730
Sudan	660	500	110	100	130	160	90 [b]
Venezuela [b]	20,100	16,600	4,050	3,220	4,470	4,750	4,110

[a] Seasonally adjusted quarterly data may not add to annual totals.
[b] Estimated.

[redacted] 25X1

OPEC Continues Postponing Capital Projects

In an effort to ease their financial difficulties, OPEC countries are continuing to delay, reduce the size, or indefinitely postpone capital projects. Indonesia, Saudi Arabia, Nigeria, and Venezuela are implementing massive cuts. Indonesia is rephasing 47 major construction projects totaling an estimated $21 billion. Saudi Arabia has reduced capital spending, particularly on the development of the Jubail and Yanbu industrial cities, and two major pipeline projects and two complexes for saline water conversion have also been shelved.

In addition, payments are being delayed up to 90 days and new contracts are not being awarded. The Nigerian National Economic Council has recommended that all public-sector capital projects not yet under way be suspended with the exception of agricultural projects. Shrinking petroleum export earnings have forced Venezuela to postpone indefinitely spending on roads, bridges, urban development, and petrochemical/electricity generation projects. A pickup in oil export earnings later this year, as anticipated by OPEC, probably will be insufficient to allow a resumption of capital investments. 25X1

Swedish-Danish Continental Shelf Boundary Dispute

Recent Danish preparations to test-drill for oil in the Kattegat Strait, located between Denmark and the southwest coast of Sweden, sparked a weeklong confrontation between the two countries in early August. Denmark claims the boundary of its economic zone should be placed between the small, virtually uninhabited Danish island of Hesselo and the Swedish mainland, while the Swedes argue for a boundary line drawn from mainland Denmark, effectively giving them a larger part of the potentially oil-rich shelf. After a rather heated exchange of letters, and a meeting between Swedish Prime Minister Olof Palme and Danish Prime Minister Poul Schluter in Helsinki on 7-8 August, both parties agreed to renew bilateral negotiations within a few weeks.

According to US officials in Stockholm, negotiations on the disputed sea territory have taken place before, but no agreement was ever reached. 25X1
Stockholm's negotiating position is complicated by the fact that it is also involved in a dispute with the Soviets on a Baltic Sea continental shelf boundary. Sweden's position in that situation is similar to the Danish stance on the Kattegat—Sweden wants a boundary on the eastern edge of the Swedish island of Gotland, instead of between the island and the Swedish mainland, as the Soviets insist. Although Sweden and Denmark are also at odds over several other issues—including the reintroduced Swedish proposal for a Nordic nuclear-weapons-free zone—we believe that prospects for a reasonable boundary settlement are good because both sides want to put behind them an embarrassing situation that has marred their otherwise good relations.

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National Developments

Developed Countries

London To Sell BP Shares to Offset Budget Deficit

The British Government is planning to sell part of its remaining stake in British Petroleum (BP) to raise $750 million to help reduce the expected 1984 budget deficit. The government reduced its original 51-percent stake in BP to 39 percent in 1979 shortly after Thatcher took power. The sale is consistent with Thatcher's policy of selling off state holdings. Earlier this year portions of British National Oil Company and British Gas Corporation were offered to the

public. Four other state-owned firms have been "privatized" since 1979, garnering some $2 billion for the Treasury. The planned sale next year of the 51-percent share of British Telecom, the highly profitable state telephone company, would bring an additional $6 billion. 25X1

Thatcher has speeded up her plan to sell off state-owned assets because of continuing budget problems. Revenues next year are expected to fall $7.5 billion short of the projected $190 billion in expenditures. Thatcher's new economic team, including Chancellor of the Exchequer Nigel Lawson and Energy Secretary Walker, have been frantically searching for new sources of revenue and spending cuts to bring the deficit in line. The government fears that the large deficit could end the economic recovery now under way. 25X1

Less Developed Countries

Philippine Balance-of-Payments Strains

Revised Central Bank data for the first half of 1983 show the Philippines' current account deficit totaled $1.6 billion, matching last year's record-setting first-half deficit. Exports dropped 8 percent despite higher earnings for sugar and copper, while imports remained at 1982 levels because of stronger capital goods and raw material orders. With Central Bank liquidity severely strained, Manila had counted on an improvement over the 1982 deficit in order to assuage foreign commercial creditors. The government now faces the possibility that there will be little improvement in the second half of the year, despite an 8-percent devaluation in June and several new austerity measures. Even if traditional commodity exports continue to show improvement, the 1983 current account deficit probably will exceed $3 billion—about $500 million more than the IMF program target. 25X1

Peruvian Payments Difficulties

According to the US Embassy in Lima, the Central Bank now estimates the 1983 current account deficit will total $1 billion, 20-percent larger than earlier projections. Lima cut its trade surplus projection to only $65 million because of continued depressed demand for mineral exports and weather-induced crop shortfalls that are pushing up food imports. In addition, the services deficit is forecast to be above $1.1 billion because of declining tourist receipts as a result of the adverse publicity generated by terrorist activity. 25X1

The Central Bank also estimates that there will be a $3 million net outflow of long-term private capital this year, reflecting worsening economic conditions and concern over rising terrorist activity. Earlier, Lima cut its foreign direct investment projection by 60 percent to $17 million because of lack of interest in new investments in the mineral sector. With foreign reserves now at only $500 million—two months of imports—Peru will face debt servicing difficulties if it fails to attract new international lending by the end of the year. 25X1

Burmese Economic Growth Slows

According to the US Embassy, Burma's GDP for the year ending 31 March grew by less than 4 percent, compared with 8.3 percent the previous year and an average of 6.6 percent during 1978-82. The depressed international price of rice, sluggish growth in the manufacturing sector, and a shortfall in oil production were the principal causes for the slowdown. Burma's relatively poor performance is not likely to improve markedly over the next year because of drought in some growing areas and the poor quality of Burmese rice exports. US Embassy officials report, however, that Rangoon is considering its first oil imports in eight years in an attempt to reverse the economic decline. 25X1

Mauritian Elections and Foreign Financial Assistance

Mauritius's longstanding economic problems—the focus of the current election campaign—will remain intractable regardless of whether the ruling Mauritius Socialist Movement (MSM) or its like-minded opponent wins on 21 August. The election was called because the MSM feared a no-confidence vote in the National Assembly over its austere 1983/84 budget. A new standby agreement with the IMF was obtained in April, but conclusion of the agreement depends on the passage of an austere budget for 1983/84. Passage of the budget is likely to be assured only if the winning party secures a sizable majority in the legislature; many members of both parties, however, are opposed to austerity measures. 25X1

We believe that leaders of both groups contesting the election recognize that any government will have to follow pragmatic economic policies to attract continuing Western assistance and ensure future growth. Without such assistance, continuing deficits could lead to increasing political instability. According to IMF projections, the budget and current account deficits will decline this year, but external debt servicing will rise substantially as a result of previous borrowings. Financing these deficits will depend on some $95 million in aid from the IMF and World Bank, and $55 million in Western donor assistance. 25X1

Communist

Chinese Grain Harvest and Trade Prospects

Beijing has announced a summer harvest of 82 million tons, up 10 percent from the record harvest in 1982. Summer crops normally account for roughly 20 percent of total grain production. The summer harvest was aided by an excellent winter wheat crop, which reportedly may be nearly 10 million tons above the record harvest last year of 58 million tons. With favorable weather, total grain production this year will match the record harvest of 353 million tons in 1982. Chinese officials have said that purchases of US grain will resume after the textile agreement with the United States is formally signed, but they have not indicated if China will meet the 6-million-ton minimum called for in the bilateral long-term grain agreement. For the past two years China has provided the largest market for US wheat, but it has not made any purchases from the United States since late last year.

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Soviet Economic Experiment Announced

Moscow has announced an "economic experiment"—to be instituted in selected industries on 1 January 1984—that is designed to boost worker productivity and stimulate innovation in industry. Although the implementing decree is vague on specifics:

- Enterprises are to be allowed greater autonomy in using investment, wage, and R&D funds to stimulate innovation and introduce new technologies; greater access to bank credit to purchase new equipment; and increased flexibility to link worker and management wages more closely with enterprise performance.

- The current number of plan indicators is to be reduced and enterprise performance evaluated more strictly on the basis of sales that meet contract obligations, scientific and technological innovation, productivity increases, and production cost reductions.

Most of the "new measures" called for have been tried before unsuccessfully. The reordering of success indicators, for example, is a familar move. Also, the call for increased enterprise control over R&D, wages, and investment fails to define how much power would be exercised and implies that central authorities still would retain considerable leverage over plant activities. 25X1

General Secretary Andropov has openly expressed his dissatisfaction with the performance of the Soviet economy but has moved cautiously in introducing change. In a speech to veteran party members on 15 August, for instance, Andropov expressed discontent with the pace at which the economy is improving and the current lack of vigor in the search for solutions to its problems. The General Secretary indicated that more experiments—and possibly some more sweeping modifications of the existing system of planning and administration—would be forthcoming before the 12th Five-Year Plan (1986-1990) begins. 25X1

Andropov's Comments on East European Economic Reforms

25X1 General Secretary Andropov was displeased with a proposal by some Polish leaders to expand their private economic sector. He also expressed misgivings over proposals to expand factory autonomy made by Hungarian leader Kadar during his recent visit to Moscow. 25X1 the Hungarians had approached the limits of what is permissible on economic reform and that Moscow is increasingly concerned with Budapest's Western economic orientation. 25X1 25X1 Andropov recognizes the need to permit differences among "socialist" states and claims that the Soviet leader favors evolutionary change to revitalize "socialism." The US Embassy in Budapest says that the Hungarians remain confident that Andropov still supports the main thrust of their reform program. 25X1

Some of Andropov's colleagues may be urging him to restrain East European reform moves. [redacted] 25X1
[redacted] The Soviets have been critical of 25X1
the role of the private sector in Poland, and Andropov is likely to resist greater concessions to it by Warsaw. He has been a strong supporter of Hungarian economic reform, but he may now feel that managerial autonomy there has gone as far as it can without undermining the "socialist" system. Budapest appears committed to further reforms, but Kadar may back off from more far-reaching proposals to satisfy his critics in Moscow. Andropov's reported views suggest he realizes that East European experience will provide no quick fixes and that he will be wary of relying on market mechanisms to revitalize the Soviet economy. [redacted] 25X1

Soviets Increase Imports of Freight Cars

Soviet production of freight cars has declined in each of the last six years, and recent agreements with Finland, Czechoslovakia, and East Germany for railcars and locomotives may reflect Moscow's intention to rely on imports to supplement domestic production instead of increasing investment in domestic output. In 1982 the Soviets concluded a $70 million agreement with the Finnish firm Rautaruukki, Inc. to build a railcar manufacturing plant in Finland and produce rolling stock for the USSR. Under another contract valued at $53 million the Finnish firm Haka will build a railcar production and repair facility at Tosho near Leningrad. Imports may account for 10 to 15 percent of new Soviet freight cars annually by the late 1980s. [redacted] 25X1

High-Technology Materials: Intensifying Foreign Competition

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New materials are being developed that increase the strength and durability as well as lower the operating costs of a wide variety of commercial products and military systems. These materials can have a tremendous impact on the competitiveness of products cumulatively worth hundreds of billions of dollars annually. Quicker-than-ever advances in manufacturing processes have contributed to an unprecedented pace in materials development.

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High Commercial and Strategic Stakes

Advanced materials enhance equipment performance and/or product competitiveness in one or more of the following applications:

- In special components critical to system performance. Although unit prices may be small relative to overall system costs, the value of such components to the system is high. Example applications are: semiconductor-based memory chips and microprocessors, the single light-emitting crystal in a laser, and composite "Chobham" armor in modern tanks.

- As substitute materials in equipment, providing either greater durability or lower operating costs. Examples are: fracture-resistant composites [1] in helicopter rotors and lightweight materials in fuel-efficient automobiles.

- In components for improving human health, such as body replacement parts.

Many of the applications most affected by advanced materials are found in the transportation and information sectors. In civil and military transportation applications, the rise in energy prices during the 1970s spurred ongoing R&D to improve the fuel efficiency and durability of vehicles through the innovative use of advanced materials:

- Diesel engines with the pistons, manifolds, cylinder heads, and liners made of ceramics can be operated at high temperatures, improving thermodynamic efficiency, horsepower, and fuel consumption. Experts anticipate increases of 30 percent or more in fuel mileage in automobiles, trucks, and tanks. Moreover, as technology advances permit higher engine operating temperatures, cooling systems may eventually be eliminated.

- Durable single-crystal turbine blades will help stretch the operating lifetime of commercial jet engines, as well as permit their operation at higher temperatures.

- In civil airframes, composites may be near the threshold of a major increase in use. The newest airframes (such as the Boeing 767) already use composites extensively in secondary structures, such as elevators, spoilers, rudders, and engine cowlings. Sizable rewards await airframe manufacturers who can safely and economically use composites extensively in the primary structures—main wings and fuselage—of large commercial aircraft.

- Automobile bodies will become lighter through more extensive use of engineering plastics, composites, and advanced alloys.

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[1] Composites are combinations of two or more materials. In the most common composites, strong fibers are used to reinforce plastics (for example, fiberglass).

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Selected Advanced Materials and Applications

Material	Application	Advantage	Timing	Comment
Structural				
Metals				
Single crystal	High temperature turbine blades in aircraft jet engines	Strength; resistant to fracture at high temperature	Currently available	
Amorphous	Transformer cores	Easily remagnetized without loss of structural strength	Under development; being field tested	Economics may be marginal
Lightweight alloys	High-stress parts in airframes and automobiles	Fuel efficient in vehicles	Under development	Costs barrier to widespread use
Ceramics	High-temperature [a] engines in automobiles and tanks	Fuel economy	The uncooled, all-ceramic engine is a 21st-century application	Raw materials inexpensive and widely available
	Automobile parts such as turbocharger rotors, cylinder liners and heads, and pistons	Lighter and more durable than metals at high temperatures	Currently used in operating prototypes	Brittleness barrier to wide use
	Cutting tools	Wear resistant	Widely available	High cost of tool breakage limits use to special applications
Engineering plastics	Vehicle dashboards and equipment shells	Cheaper than nonplastics; tough, corrosion resistant at moderate temperatures	Continuing developments; some high-performance plastics no longer advanced	Consumer dislike barrier to extensive use
	Construction; modular housing	Inexpensive	Increasingly available	Large Third World market
Composites		Strong and stiff relative to weight		Effects of aging not well understood
Fiber-reinforced plastics (including carbon-carbon)	Aircraft, automobile, high-speed train bodies	Strong and lightweight; hence fuel efficient in vehicles	In commercial aircraft, safety fears hold back use in wings and fuselage	High cost of parts fabrication barrier to widespread use
	High-stress parts; helicopter rotors, aircraft wings, and brakes; automobile drive shafts and leaf springs; casings for rocket motors and jet engines	Fracture resistant under high stress	Increasingly available	
	Stealth aircraft	Poor radar reflector	Long-range potential	
Metal matrix	Automobile engine blocks	In castings, much stronger than unreinforced metals	Currently in working prototype	May outcompete more publicized ceramics
	Piston heads in automobile engines	Greater durability at high temperature	Current application	

Selected Advanced Materials and Applications (continued)

Material	Application	Advantage	Timing	Comment
Functional				
Advanced semiconductors				
Gallium-arsenide	Electronic circuits, lasers, sensors, receivers	Switching speed of devices significantly faster than silicon	Already used in military applications	
Optical	Fiber optics (glass)	Speed-of-light, RF [b] emission-free means of transmitting information	Already replacing metal wires	
	Lasers		Widely available	As costs fall, industrial use may increase rapidly
	Optical-computing elements	Ultrahigh speed	A next-century application	
	Sensors	Index of refraction of electro-optics sensitive to pressure, temperature, sound, and magnetic field	Early in development	Notable military interest, such as for submarine detection
Membranes	Chemical industry	Chemical separation processes inexpensive and pollution free	In development	Numerous potential applications; market could expand rapidly
	Water desalination		In development	
	Body replacement parts: artery, vein walls		Minor use to date	

[a] The higher the operating temperature of an engine, the better its fuel efficiency. Ideally, the weight and expense of cooling systems can be eliminated.
[b] Radiofrequency emissions in conventional communications often degrade system performance and risk compromise of transmitted information.

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Advanced nonmetallic structural materials also promise some relief from dependency on Third World suppliers of strategic minerals.

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In civil and military information applications, researchers are looking to increase computing speeds, expand memory capacities, and reduce power requirements for electronic components by exploiting advanced materials. As silicon-based semiconductors approach theoretical performance limits, researchers are experimenting with faster semiconductor materials such as gallium-arsenide (roughly 10 times faster) and indium-antimonide (roughly 1,000 times faster when used in optical switches). Optical fibers made of silicon glass are outcompet-

ing copper wires in communications applications because of greater message-carrying capacity; the same diameter cable is capable of carrying roughly 10 times more messages.

Reaching a High-Risk Market

The problems and risks in bringing new materials and products to the market are often sizable. Development is costly and time consuming with no guarantee of technical success or economic feasibility. Market uncertainty is the greatest risk to suppliers of innovative materials. A number of suppliers, burdened with financial pressures, often find it expedient to license technology, even to overseas competitors.

For materials users, timing in product development and market entry can be critical. At one extreme, companies that fail to apply advanced materials at an early stage may be hard pressed to catch up with competitors, as their technically outdated or overpriced products slump in market share. At the other extreme, overaggressiveness in application of advanced materials can be disastrous. The Rolls-Royce bankruptcy and bailout in the 1970s by the British Government resulted in part from using unproven turbine blades made of composite material in a new jet engine. The engine (now the RB211) was for the then new wide-body jumbo jets.

Industry Structure

The importance and pervasiveness of advanced materials in civil and military applications have driven many corporations, as well as most governments, to be active in materials R&D. In the conventional sense, however, there is no materials industry per se and no major players dominate the field. In the United States alone, research groups pursuing advanced materials number in the hundreds, if not the thousands. Most groups reside within manufacturing firms—some of which are multinationals—or in universities affluent enough to afford necessary research equipment. Additionally, a few independent laboratories specialize in materials research.

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Government involvement in materials R&D, once rather selective, is on the upswing. The US Government has pursued materials R&D for advanced military, nuclear, space, and, more recently, energy-related applications. Responsibility for developing and exploiting advanced materials for other applications has been left primarily to the private sector. Overseas, this government-private industry pattern has been mirrored to a large degree, but this is changing.

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Intensifying Foreign Competition

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Foreign governments—Japanese and French in particular, which are looking for high-technology solutions to improve their long-term industrial competitiveness—are moving quickly to develop indigenous capabilities in key advanced materials. In the short term they are encouraging firms to be aggressive in installing production capacity for some of the most promising new materials, even in the face of weak demand. For the long term, Tokyo and Paris are undertaking unprecedented national programs, funding "common-denominator" materials research with the intent of fanning out results to domestic commercial firms for proprietary product development.

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Japan. Tokyo has initiated several programs to develop advanced materials:

- In FY 1981 MITI provided initial funding for a decade-long effort, the "Next-Generation Industries Basic Technologies Research and Development Program." The projected funding for materials under this program is $250 million.[2]

- The Science and Technology Agency in FY 1981 launched basic research on materials via four R&D projects: superfine particles, special structure substances, fine polymers, and perfect crystalline structures. The agency is planning to

[2] Converted at the rate of 244 yen=$1.

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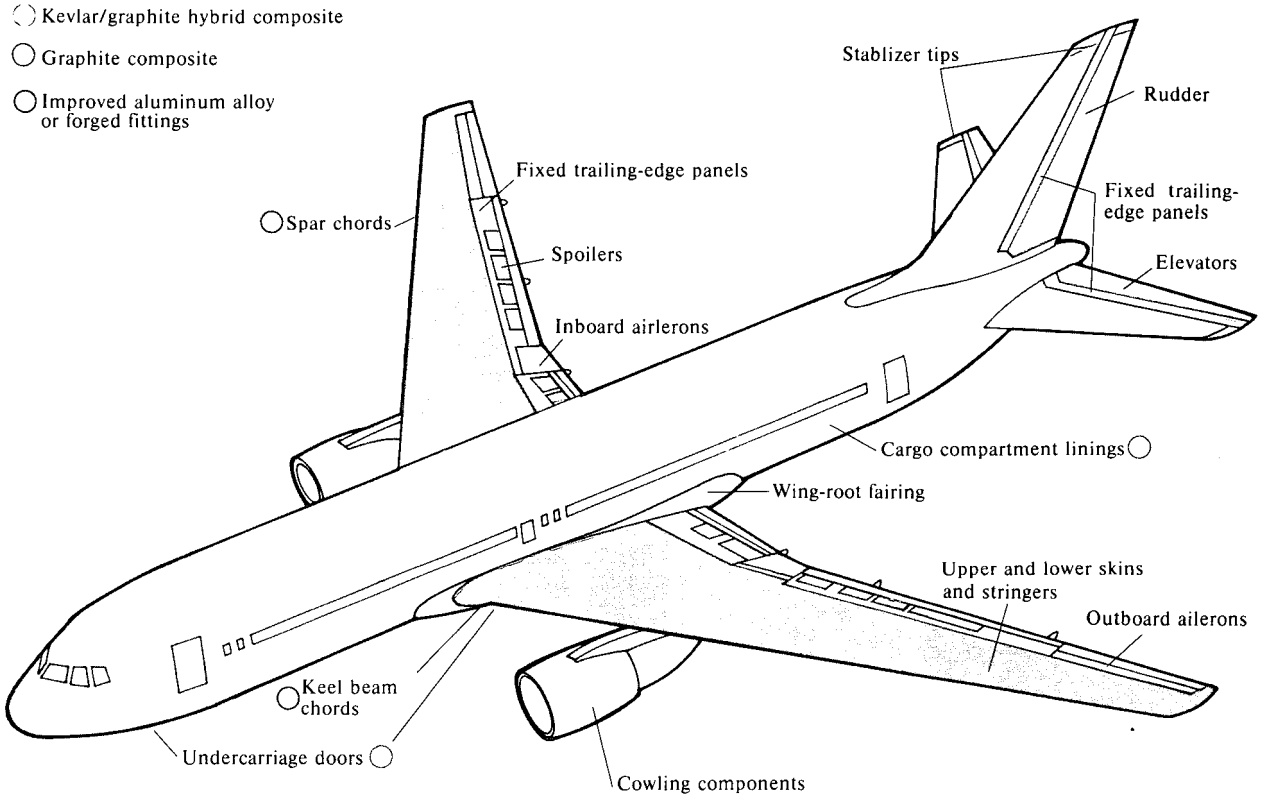
Use of Advanced Materials in Commercial Aircraft



Advanced materials in the Boeing 767 are designed to produce a light, durable, and fail-safe structure with low cost of ownership. This drawing shows the distribution of hybrid Kevlar/graphite composites and graphite composites.

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spend $36 million over the five-year lifespan of the projects.

- The Ministry of Education is sponsoring training programs to supply qualified personnel for engineering and production positions.

Several examples illustrate areas where Japan is at the forefront of materials technology:

- Toyota already markets an automobile whose engine contains metal-matrix (ceramic fibers in aluminum) piston caps.

- Isuzu is commercializing ceramic parts in diesel engines. Ceramic glow plugs are already on the market, and ceramic precombustor cups (the hottest part of the combustion chamber) will soon follow.

- A Japanese corporation, Kyocera, controls about 70 percent of the world market in ceramic packages for microelectronic chips.

Western Europe. The French announced in late 1982 their national program for materials development funded at 1 billion francs ($125 million)[3] for three years. Under the Mitterrand government's new plan for industrial revitalization, the French are counting heavily on newly nationalized companies to take the lead in such research. The West Germans are focusing on development of the ceramic diesel engine, having formed both a consortium of domestic companies for cooperative R&D and a Max Planck Institute to specialize in advanced ceramics. Individual firms, both private and public, in these two countries and in a number of other West European countries have carved out leadership roles within specialty niches in advanced materials—such as Ciba-Geigy (Swiss), a major supplier of matrix polymers for composites, and Aeritalia, the main supplier of composite parts for the Boeing 767.

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[3] Converted at the rate of 8 francs=$1. (U)

South Korea: Moving Up the Technology Ladder

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South Korea is embarking on an ambitious plan to restructure its industrial base in favor of skill- and knowledge-intensive industries. Seeking a second economic takeoff, the Chun government is targeting microelectronics, computers, machine tools, and sophisticated shipbuilding for rapid growth. Seoul has adopted a broad set of policies aimed at encouraging manpower development, enhancing the country's R&D capabilities, and attracting advanced technology from abroad. Seoul is likely to establish solid market niches in selected medium-technology products, particularly small computers, computer peripherals, and machine tools.

Focusing on Technology

The South Korean Government, which fostered the rapid development of labor-intensive, light manufacturing industries—textiles, footwear, plywood, and consumer electronics—during the 1960s and early 1970s, undertook an ambitious program to broaden the country's industrial base in the mid-1970s. Judging that it would gradually lose its comparative advantage in labor-intensive light industries to lower cost producers, Seoul vigorously pushed a shift to capital- and technology-intensive industries in its Fourth Five-Year Plan (1977-81). These included machinery, iron and steel, automobiles, shipbuilding, chemicals, and more sophisticated electronics. The private sector, responding to government financial incentives—especially subsidized credit—invested heavily in these targeted industries.

South Korea is focusing on upgrading technology in the Fifth Five-Year Plan (1982-86). Emphasis is on investment in R&D and manpower development. Skill- and knowledge-intensive industries, as opposed to capital-intensive industries, are being encouraged. Korean economic planners believe that knowledge-intensive industries, with their relatively low energy requirements and high reliance on skilled labor, will best exploit the country's primary strength—its work force—while protecting it from its primary weakness—a lack of natural resources.

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Seoul is targeting electronics (semiconductors, computers, and communications equipment), general machinery (machine tools and parts and components), and shipbuilding for rapid expansion. Exports of these products are expected to increase 30 percent a year during 1982-86. By the mid-1980s Seoul intends to be producing large-scale integrated circuits, microcomputers, sophisticated electronic switching systems, and more advanced types of ships and offshore equipment. Industries that use large amounts of energy—particularly steel, nonferrous metals, and petrochemicals—will grow slowly. Improving quality will be the watchword for light manufacturing such as textiles, clothing, and footwear, as these industries move into higher-value-added ends of product lines.

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Supporting Policy

Seoul has adopted a detailed set of policies to move up the technology ladder. The Ministry of Science and Technology's Five-Year Research and Development Plan contains a wide range of policies to encourage manpower development, enhance domestic R&D, and attract foreign technology. As in the past, Seoul is providing generous tax and financial incentives to encourage firms to invest in targeted skill-intensive fields. By 1986, Seoul projects that R&D spending will equal 2 percent of GNP, as

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compared with 1 percent in 1982. Seoul is also protecting domestic producers from imports in selected industries, particularly computers and machine tools, by banning or severely restricting imports of such products.

To meet the increased need for skilled workers, Seoul is implementing a broad-based program to upgrade educational and technical training. University enrollment is being expanded significantly, scholarships and research subsidies are being increased, and military exemptions are being granted to graduate students. In addition, overseas training programs and exchanges with prestigious foreign universities are being expanded. Seoul is also putting priority on attracting Korean-American engineers and scientists from abroad.

Seoul expects the country's nine government research institutes to play a major role in upgrading the nation's technological prowess. These research institutes work closely with private firms in industry-oriented R&D. The Korea Institute of Electronics Technology, for example, is the center for the development of computer technology and semiconductors. Many of the public research institutes are located in the Taedok science city in central Korea alongside private and university research institutes. The importance the government attaches to upgrading the country's technological base is underscored by the quarterly science and technology review meetings in which the heads of the research institutes make oral presentations to President Chun on their plans and progress.

South Korean economic planners also want to attract advanced technology from abroad through joint ventures and technical licensing agreements. Seoul envisions the inflow of foreign investment increasing from the $100 million per year average of recent years to $700 million in 1986. To encourage this growth, the Ministry of Finance has announced several policies to improve the foreign investment climate. The government has also liberalized regulations concerning technology imports and this has resulted in increased inflows in recent years.

Industry's Role

Taking their cue from the government and armed with technical licensing agreements with multinationals from the United States, Japan, and Western Europe, South Korea's large conglomerates are gearing up for a major move into skill-intensive areas. Nowhere is this more apparent than in electronics:

- Hyundai—the country's largest conglomerate—has announced a five-year, $450 million investment program to mass produce semiconductor chips in facilities in South Korea and in California's Silicon Valley.
- Samsung, backed by a technical agreement with ITT, will pour $400 million into semiconductors and electronics projects over the next five years. With the startup of its joint venture plant with Corning Glass in March, Samsung has already become a world-class competitor in one of the most difficult glass technologies, glass picture tubes for color televisions.
- Gold Star, which has been in the forefront of Korea's electronics industry, plans to turn out 64K RAM chips by 1984, a goal they can probably reach.
- Samsung has a licensing agreement with Hewlett Packard for minicomputer production, and three other Korean firms will be making home computers this year.

South Korean businessmen are also seeking to move into other more technology-intensive industries:

- The Kolon group has joined forces with Japan's Fanuc Corporation to set up South Korea's first plant to manufacture industrial robots.
- Daewoo is moving into more sophisticated machine tool production, including numerically controlled machine tools.

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- Hyundai is upgrading its technological capabilities in the auto industry; the company has a technical licensing agreement with Mitsubishi to produce a front-wheel drive car that will be marketed in the United States in the mid-1980s.

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Strengths

South Korea has a number of factors working in its favor in moving ahead with its industrial restructuring. The country's highly motivated, well-educated, adaptable work force remains a major advantage. South Korean schools will turn out thousands of highly qualified engineers and scientists over the next decade. From a cost perspective, South Korean engineers will remain a bargain; their wages are only one-fifth to one-fourth those of their US counterparts.

The size and diversification of Korea's major conglomerates give the country an important advantage over the other East Asian newly industrializing countries. Korean industrial giants can afford to gamble on new products and take initial losses in the new, technology-intensive industries, offsetting the red ink with profits from their other business areas. They also have greater financial resources to commit to developing new products. In addition, South Korea's larger population and GNP give it a larger domestic market.

South Korea's demonstrated capabilities in assimilating new technology and the government's clear-cut commitment also augur well for the country's move upmarket. South Korea has already moved ahead of the other East Asian NICs in semiconductors.

Obstacles

The speed and extent to which South Korea succeeds in moving to more advanced technologies will depend on Seoul's success in dealing with several internal obstacles and on how rapidly international demand increases. The advance of the East Asian NICs into the same fairly narrow range of medium-technology products could lead to overcapacity unless global demand increases sharply:

- South Korea will need to develop better marketing and quality control to demonstrate to consumers the reliability of its products in these new areas.

- Despite its ambitious training program, supplying enough skilled workers could present another obstacle, particularly in meeting the demand for scientists.

- Perhaps the most significant problem is the country's somewhat tarnished image among foreign investors. A number of foreign companies have charged that the policies of the South Korean Government have been arbitrary and unresponsive in recent years.

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Significant Advances Coming

We do not foresee South Korea's moving into a broad range of high-technology products. It lacks the size and financial capabilities to imitate Japan's broad industrial development, and its level of technology will remain well behind that of developed countries for at least the rest of the 1980s. In our judgment, South Korea will be successful over the next five years in establishing market niches in selected medium-technology products.

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In shipbuilding, Seoul hopes to expand exports from its current 8-percent share of the global market to about 10 percent, a gain that would be made largely at the expense of West European and Japanese firms. In microelectronics and machine tools, South Korean companies will be competing to some extent with both US and Japanese companies; in some cases the Koreans are aiming at product lines that US and Japanese firms are giving less

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emphasis to as they themselves move up to higher technology goods, such as in less sophisticated lathes and lower priced stereo equipment. Nonetheless, some small and medium-sized US companies are likely to feel the increased competition. In textiles and footwear Seoul's strongest competitors will be the other East Asian NICs. [redacted] 25X1

[redacted] 25X1

Japan: Financial Strength Spurs Auto Industry

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The enormous financial power of the major Japanese automobile firms gives them a substantial advantage in competition that will involve the world's auto manufacturers during the balance of the 1980s. This growing financial strength gives Japanese companies more flexibility than US firms to:

- Sustain investment in expanding and upgrading production facilities.
- Support an R&D program that can take high risks.
- Mount large foreign investment programs and move production offshore to assure access to third markets.

Furthermore, because the auto industry is increasingly becoming a user of advanced technology, the strong Japanese automobile sector should also help enhance the competitiveness of Japan's high-technology industries.

Japanese Financial Reporting

We believe that the collective financial power of Japanese automakers is significantly greater than is reflected in their annual reports. Since Japanese auto companies are final assemblers of components from highly integrated groups of independently reporting subsidiaries, the annual reports understate the financial power of the parent firm. Toyota and Nissan, for example, each have more than 200 subsidiaries, and the value added at Toyota represents only about 30 percent of the total value of the vehicle. Furthermore, unconsolidated financial reporting allows the automakers to conceal a variety of transactions. Industry sources believe funds are transferred among affiliated companies with different accounting periods to hide profits and cash reserves.

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Steady Financial Growth

The financial strength of Japan's automakers has increased steadily over the past decade. With a high-quality, fuel-efficient product line and an aggressive marketing strategy, Japanese firms have been able to ride out both market downturns of the past decade (1974-75 and 1980-81). These high sales volumes, in conjunction with their ability to increase labor productivity and reduce manufacturing costs, have provided high returns on sales and capital over the past decade. High returns have enabled the producers to reduce long-term debt, further reducing costs. Toyota, in fact, has been debt free since 1978.

Most Japanese auto firms have maintained positive cash flows, despite the current slowdown in sales at home and growing constraints on export volume. Faced with voluntary quotas, the Japanese have raised profit margins by selling higher value vehicles and by taking advantage of favorable exchange rates. As a result, net working capital, a general measure of liquidity, has also remained high or, in the case of Toyota, increased. US firms, in contrast, were forced to invest heavily in R&D and process technologies during the recent sharp sales downturns in order to increase competitiveness. To finance these large capital needs, US firms have had to cut dividends, reduce working capital, liquidate assets, and turn increasingly to long-term debt.

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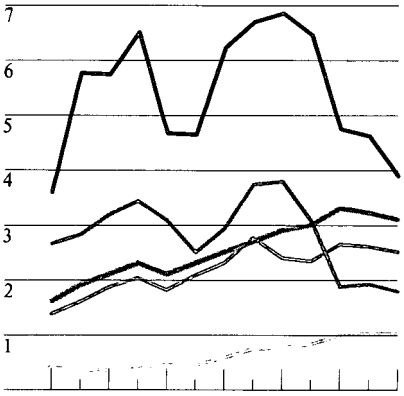
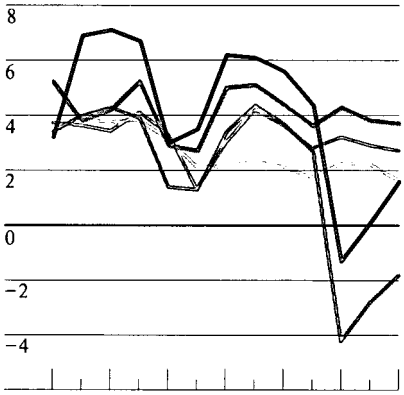
US and Japanese Automakers: Comparative Financial Performance

Toyota
Nissan
Honda
General Motors
Ford

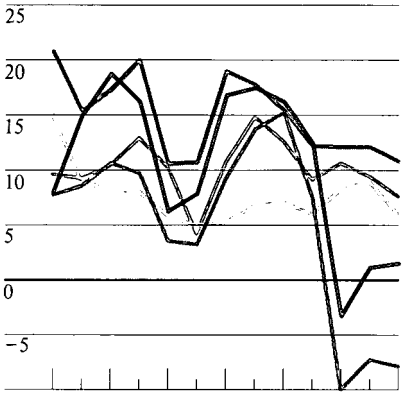
Comparative Sales Performance
Million units



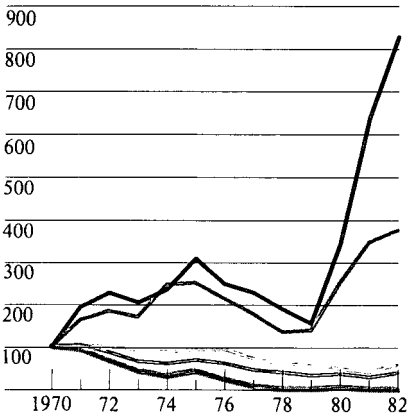
Net Return on Sales[a]
Percent



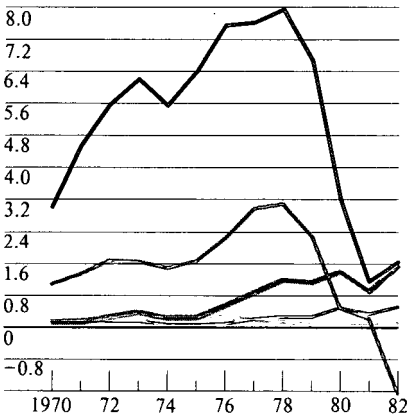
Return on Total Long-Term Capital[b]
Percent



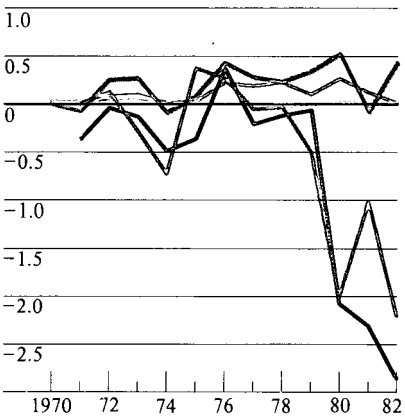
Long-Term Debt as a Share of Long-Term Capital
Index: 1970=100



Net Working Capital[c]
Billion US $



Primary Operating Cash Flow[d]
Billion US $



[a] Ratio of net profits to sales revenue.
[b] Ratio of net profit to long-term debt plus equity.
[c] Current assets minus current liabilities.
[d] Net profits plus depreciation less capital spending.

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Flexing Financial Muscle

Japanese automakers are currently using their financial strength to prepare themselves for the uncertain market environment of the next few years. They are investing in advanced plant and equipment, long-term R&D, overseas production facilities, and diversified product areas.

Domestic Capital Spending. Usually over half of each company's financial resources [1] are used to strengthen its production capabilities and manufacturing efficiencies. Although much smaller than for US firms, continued increases in capital expenditures confirm the plowback of Japanese resources into capacity expansion and manufacturing processes to meet future world markets:

- We estimate Japanese annual production capability will increase by 1.3 million vehicles to a total of 12.5 million vehicles by 1985. Although neither Toyota nor Nissan have announced plans to expand domestic production facilities, most smaller firms intend to increase capacity significantly. Toyo Kogyo, for example, has three new assembly plants under way, each with a capacity of 240,000 cars per year.

- Major expenditures on manufacturing technologies include the application of advanced robotics, CAD/CAM (computer-aided design/computer-aided manufacturing) and flexible manufacturing systems. Toyota and Toyo Kogyo are testing new automated stamping presses that will virtually eliminate labor in the entire stamping to assembly operation. Overall, industry experts estimate the Japanese will increase productivity 20 percent in the late 1980s by increasing the use of automation in the manufacturing process.

To maintain high levels of capital spending, Japanese auto firms are increasingly seeking equity funds. The equity is owned primarily by Japanese financial institutions (rather than by individual shareholders), which have tended to be unconcerned about short-term profits or a quick return on investment. Thus, Japanese firms can use the capital to focus on longer term investment decisions, rather than to generate short-term profits for shareholders' dividends. 25X1

R&D Expenditures. Financial power, coupled with aggressive management, has enabled Japanese auto firms to undertake some high risk R&D choices. Current R&D expenditures center on further improvements in vehicle fuel efficiencies such as developing ceramic ignition parts, electronic engine and transmission controls, and improving aerodynamics. Industry specialists indicate that one of the most important near-term Japanese product developments is an electronically controlled direct injection diesel engine for use in passenger cars. We expect these engines to be introduced by Nissan, Toyota, and Isuzu in the mid-to-late 1980s. 25X1 25X1 he introduction of these engines will give the Japanese a major competitive boost in the world diesel car market. 25X1

Longer term R&D expenditures focus on ceramic diesel engines and composite materials. Isuzu, for example, has successfully road tested diesel engines with ceramic parts. In the composite materials area, Toyota is already marketing a car whose engine incorporates aluminum pistons reinforced with alumina-silica ceramic fibers 25X1 Japan's competitive position 25X1 will be enhanced because its automakers have the financial ability to assume the high risks and cost of moving these developments into production. 25X1

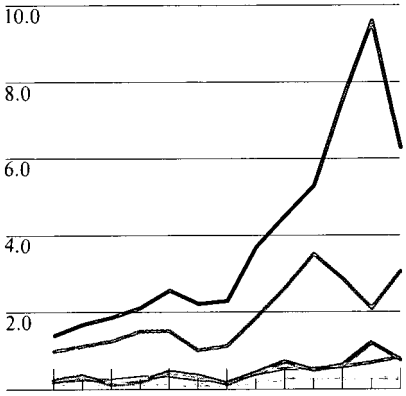
Foreign Investments. To overcome market access restrictions, firms such as Nissan and Honda are using a substantial proportion of their funds to establish production facilities overseas. Heavy reliance on foreign sales—Honda exports 73 percent of total production, Nissan 53 percent, and Toyota 41 percent—makes the Japanese extremely vulnerable 25X1

[1] Net income plus depreciation, debt, and equity.

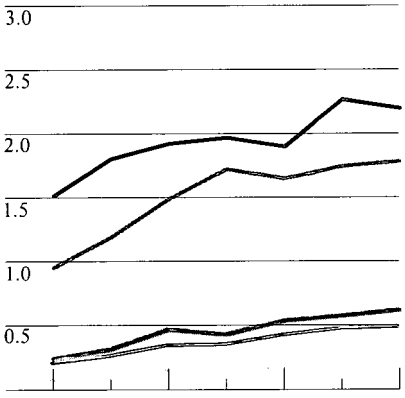
US and Japanese Automakers: Research and Development and Capital Expenditures

Toyota
Nissan
Honda
General Motors
Ford

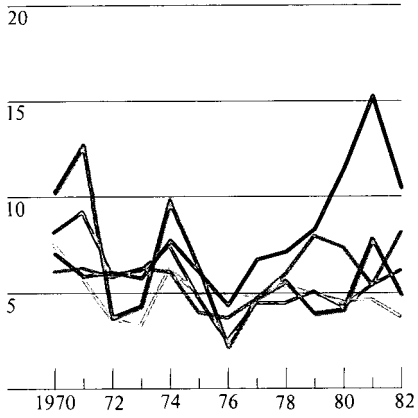
Capital Expenditures
Billion US $



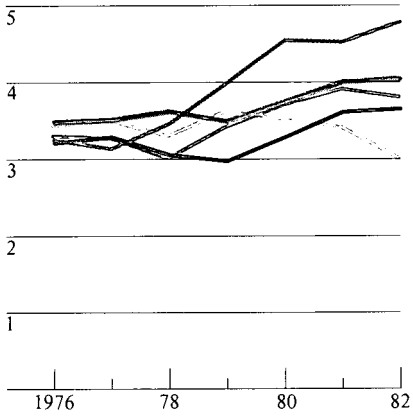
Research and Development Expenditures
Billion US $



Capital Expenditures as a Share of Sales
Percent



Research and Development Expenditures as a Share of Sales
Percent



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to these restrictions. Consequently, Japanese auto companies have spent an estimated $1.5-3.0 billion on foreign assembly and manufacturing plants over the past three years.

The Japanese have concentrated on building assembly rather than manufacturing plants abroad, thus retaining production of high value-added components, such as engines and drive trains, at home. This approach keeps auto employment high in Japan, maintains economies of scale in Japan's highly automated plants, and gives the manufacturers control over price and quality of major components central to the performance of the car. Although Japanese investment in developed markets, particularly the United States, has attracted the most press attention, the majority have been set up in the fast-growing markets in Asia and Latin America.

Other Investments. Japanese automakers are also using their strong financial position to invest in areas outside the firm. These investments have been made in subsidiaries and affiliates as well as nonaffiliated companies. The investments provide affiliates with cheap capital funds, especially for R&D, and the parent firm a means to reduce component costs through vertical integration and to increase control over suppliers. Investments in nonaffiliates offer auto companies a means to diversify their financial holdings and to reduce risks through diversification of product lines. Japanese companies are venturing into housing, machinery, and aerospace—all largely financed from the vehicle sales base.

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Outlook

Industry analysts believe the financial power of the Japanese will tend to increase, relative to their competitors, over the next decade. This growing divergence in financial strength will enable Japanese producers to increase the rate of new product and plant technology introductions and continue to move production facilities abroad. Unless the current market upturn persists for three to five years, financial experts believe it is unlikely that US automakers will ever regain the relative financial power they held prior to 1979.

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The ability of Japan's auto firms to finance state-of-the-art production lines and support an aggressive research and development program will undoubtedly affect the competitiveness of a broad range of Japanese industries. The auto industry, as a growing user of advanced technologies, will have a particularly significant impact on the robotics, electronics, and advanced materials sectors. For example, the edge that Japanese firms have gained in applying advanced robotics to the automotive sector has reinforced their advantage over US and West European robotics and machine tool manufacturers. Currently, development of ceramic auto engines is the focal point of a widespread Japanese effort to exploit advanced ceramics.

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Bahrain: Offshore Banking [redacted]

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Offshore banks—those that can do business only in foreign markets—have grown faster than any other segment of Bahrain's economy in the past decade. These banks have boosted Bahrain's foreign exchange earnings, provided high-paying jobs, and enhanced Bahrain's prestige as a regional financial center. The offshore banking sector, which now controls more assets than offshore markets in Singapore and Hong Kong, is facing harder times, however. Recent protectionist moves by the Saudi Arabian Monetary Authority (SAMA), increased competition from banks in Saudi Arabia and Kuwait, and lower regional oil revenues are likely to slow the sector's growth.

Track Record

The rapid expansion of Bahrain's offshore banking sector began in 1975. Bahrain authorities, seeking to diversify the economy and to take advantage of the enormous oil revenues generated by the oil price increases of 1973-74, courted offshore banks with:

- An excellent location near lucrative markets in Saudi Arabia, Kuwait, and the United Arab Emirates.
- First-rate communications facilities.
- Permissive banking laws that give offshore banks freedom from taxation, exchange controls, and reserve requirements.
- A willingness to tolerate Western lifestyles.
- A time zone that enables banks to do business with the Orient in the morning and the West in the afternoon.

Bahrain's attempts to attract foreign banks were boosted by the civil war in Lebanon, which ended Beirut's role as the Middle East's financial center. By early 1983, 73 offshore banks were operating in Bahrain. The major Western banks—well-established in Bahrain—are being joined by new and aggressive Arab banks with large amounts of public funds at their disposal, reflecting the trend among Arab financial institutions to play a larger role in investing Arab government funds. With assets of about $60 billion, Bahrain's offshore market now surpasses those in Singapore and Hong Kong.

Offshore bankers had originally anticipated that they would largely channel petrodollars to areas outside the Persian Gulf—principally Europe and the United States. Surprisingly, however, the banks have extended over half of their loans to borrowers in the region—primarily Saudis. Some two-thirds of the banks' funds have come from commercial banks and private sources in Arab nations.

Benefits to Bahrain

Bahrain's dynamic offshore banking sector has given the country international stature and enhanced the regime's image of permanence and stability. The banks have promoted the insurance industry and trading in precious metals, commodities, and securities. Moreover, the banks have encouraged the development of ancillary services such as construction and communications.

Offshore banks provided about $75 million, or 10 percent, of Bahrain's foreign exchange earnings in 1982. The offshore banking sector also directly contributed about 4 percent of Bahrain's GDP. In addition, offshore banks have created about 2,000 jobs in Bahrain, and they now employ 1.5 percent of the total work force. The number of Bahraini

Listing of Offshore Banking Units as of January 1982

		Country of Incorporation	Year of Establishment in Bahrain
1.	Citibank	United States	1975
2.	Algemene Bank Nederland	The Netherlands	1975
3.	American Express International Banking Corp.	United States	1976
4.	Arab Bank Limited	Jordan	1976
5.	B.A.I.I.(M.E.)	Bahrain	1976
6.	Banco do Brazil	Brazil	1976
7.	Bank of America	United States	1976
8.	Bank of Bahrain & Kuwait	Bahrain	1976
9.	Bank Saderat Iran	Iran	1976
10.	Banque De l'Indochine et de Suez	France	1976
11.	Banque Nationale de Paris	France	1976
12.	Canadian Imperial Bank of Commerce	Canada	1976
13.	Chase Manhattan Bank	United States	1976
14.	Chemical Bank	United States	1976
15.	Gulf International Bank	Bahrain	1976
16.	Hong Kong & Shanghai Banking Corp.	Hong Kong	1976
17.	Lloyds Bank International	United Kingdom	1976
18.	Manufacturers Hanover Trust Co.	United States	1976
19.	Midland Bank	United Kingdom	1976
20.	National Westminister Bank	United Kingdom	1976
21.	Scandinavian Bank	United States	1976
22.	Societe Generale (Paris)	France	1976
23.	Standard Chartered Bank	United Kingdom	1976
24.	Swiss Bank Corp.	Switzerland	1976
25.	United Bank of Kuwait	Kuwait	1976
26.	Bank of Nova Scotia	Canada	1976
27.	Arab Asian Bank	Bahrain	1977
28.	Grindlays Bank	United Kingdom	1977
29.	Korea Exchange Bank	Korea	1977
30.	Kredietbank N.V.	Belgium	1977
31.	National Bank of Abu Dhabi	United Arab Emirates	1977
32.	State Bank of India	India	1977
33.	U.B.A.F.	France	1977
34.	Al-Saudi Bank	France	1978
35.	Banco de Viscaya	Spain	1978
36.	Bankers Trust Co.	United States	1978
37.	Banque de Paris et des Pays Bas	France	1978
38.	Barclays Bank International	United Kingdom	1978
39.	European Arab Bank (M.E.)	Bahrain	1978
40.	Frab Bank (M.E.)	Bahrain	1978
41.	Gulf Riyadh Bank	Bahrain	1978

Listing of Offshore Banking Units as of January 1982 (continued)

		Country of Incorporation	Year of Establishment in Bahrain
42.	Security Pacific National Bank	United States	1978
43.	Al Bahrain Arab African Bank	Bahrain	1979
44.	Bank Bumiputra Malaysia	Malaysia	1979
45.	British Bank of the Middle East	United Kingdom	1979
46.	Credit Suisse	Switzerland	1979
47.	Grindlays International, Ltd.	Hong Kong	1979
48.	National Bank of Pakistan	Pakistan	1979
49.	Overseas Trust Bank	Hong Kong	1979
50.	Saudi National Commercial Bank	Saudi Arabia	1979
51.	Scandinavian Finance	Bermuda	1979
52.	Arab Latin American Bank	Peru	1980
53.	Arab Banking Corporation	Bahrain	1980
54.	Allied Bank Corporation	Philippines	1980
55.	Arab Solidarity Bank	Cayman Island	1980
56.	Bank of Baroda	India	1980
57.	Bank of Tokyo	Japan	1980
58.	Credit Commercial de France	France	1980
59.	Kuwait Asia Bank	Bahrain	1981
60.	Banco Estado de Sao Paulo	Brazil	1981
61.	B.C.C.I.	Luxembourg	1981
62.	Habib Bank	Pakistan	1981
63.	National Bank of Bahrain	Bahrain	1981
64.	Bank of Oman	Oman	1981
65.	United Gulf Bank	Bahrain	1981
66.	Continental Illinois National Bank and Trust Company	United States	1982
67.	Saudi European Bank	Saudi Arabia	1982

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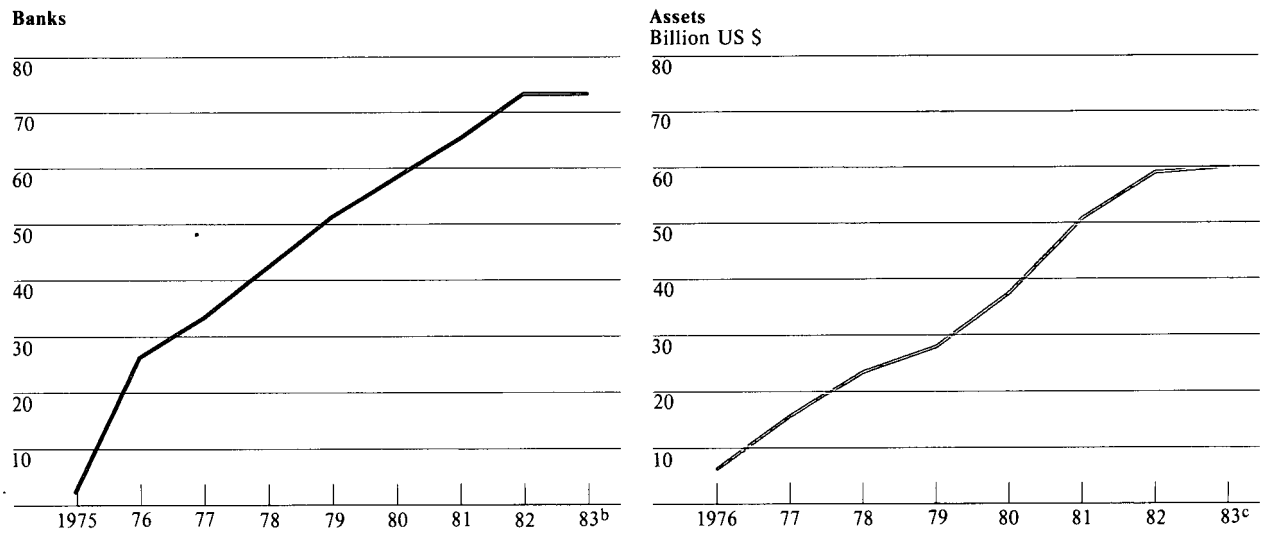
nationals employed by the banks has grown steadily—to about 1,100—and they constitute almost 60 percent of the banks' total work force. Employees in the banking sector receive better wages than workers in other sectors of the economy—$1,000 per month, as compared with $700 per month for other private-sector Bahrainis—and they are promoted without regard to their family connections or ethnic identity, a practice that is not common in Bahrain.

Problems Ahead

The Saudi Connection. Saudi Arabia is vital to the continued health of the Bahrain banking industry. Sources in Riyadh and Manama estimate that a substantial share of Bahrain's offshore banking activity originates in Saudi Arabia—local lending, trade financing, and investment advice. Moreover, Bahrain has become the principal market in the

Bahrain: Offshore Banking[a]



[a] Yearend.
[b] As of early 1983
[c] Projected.

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Gulf for Saudi riyals. Its banks handle a pool of riyals valued at about $9 billion. The Saudi Monetary Authority (SAMA) recently issued regulations forbidding Saudi banks from borrowing riyals from Bahrain offshore banks without prior permission. Abdalla Saif, Governor of the Bahrain Monetary Agency (BMA), attributes SAMA's motives to a desire to curtail the speculative dealing in riyals outside of Saudi Arabia, particularly in Bahrain. According to Embassy reporting, SAMA is also considering a tax on foreign borrowing by Saudi companies. Some bankers see this move as a deliberate attempt to steer loan business toward Saudi Arabia's fast growing domestic banks.

The Soft Oil Market. The concern about Bahrain's offshore banking has been heightened by the regional economic downturn caused by the soft oil market. Some bankers believe that banking will be hit as economic activity slows. Others, however, believe that dwindling oil incomes could create new opportunities. They believe more oil-exporting countries will begin to consider financing projects with borrowed money instead of oil receipts. As the Gulf states develop new and more sophisticated credit needs, they believe Bahrain's offshore banking community will be well positioned to provide needed services.

Competition. Aggressive Saudi and Kuwaiti banks have begun to erode Bahrain's lead in regional banking. According to open sources, some Bahraini banks are having a difficult time finding new business because Saudi and Kuwaiti banks have become more competitive. Competition for loan business has been particularly fierce, with some Arab banks cutting margins to the bone. Bahraini banks have tried to gain breathing space by providing noncredit services such as investment banking and gold dealing not generally available from other Arab banks. Bahraini bankers believe they still have an edge over Saudi banks because they are able to attract highly skilled staff that will not live in Saudi Arabia.

Outlook

The rapid growth of Bahrain's offshore banking sector is unlikely to continue. The BMA has already begun to tighten up its licensing procedures for new offshore banks because local bankers complain that there are too many banks in Bahrain for the volume of business. So far, however, no foreign banks in Bahrain have closed their offices.

It will be several months before the full impact of the new Saudi banking regulations is felt. We believe, however, that Bahrain's offshore banks will experience smaller capital inflows from Saudi Arabia, and that SAMA will continue to pursue actions designed to enable Saudi banks to compete with Bahrain banks. Nonetheless, we believe that Bahrain will continue to provide an alternative financial market for the Saudis. SAMA is seriously handicapped in trying to assert its authority over Bahraini banks because it lacks both experienced personnel and an array of central bank instruments.

The Bahrain Government has been counting on continued growth in banking as a key element in the country's economic development plan. Bahrain's Minister of Labor had expected employment of Bahraini nationals in the banking sector to double in the next decade. According to the US Embassy in Manama, however, the banks may instead slowly reduce staff. A senior officer of a large offshore bank, for example, has stated that his bank may move its operational staff to London where costs are lower and staff more easily recruited.

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